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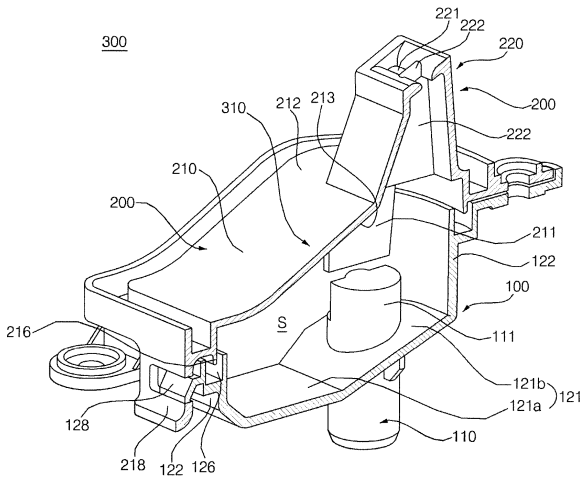
(54) CLOTHES TREATMENT APPARATUS

(57) A clothes treatment apparatus (1) is disclosed which comprises: a cabinet (10) having a treatment chamber (12) for clothes, a steam unit (40) disposed in the cabinet (10) for generating steam; and a steam spray device (300) for providing the steam into the treatment chamber (12), wherein the steam spray device (300) comprises: a main body part (310) having a first body (200) and a second body (100) being coupled to the first body to define a space (S) therein, an introduction part (110) disposed in the second body (100) for introducing the steam generated in the steam unit (40) into the space (S), a nozzle part (220) disposed in the first body (200) for discharging steam in the space (S) into the treatment chamber (12); a partition wall (211) disposed in the main body part (310) for partitioning at least a portion of the space (S) into a first space (SI) and a second space (S2), the partition wall (211) defining a gap (P) through which steam flows from the first space (SI) to the second space (S2), the partition wall (211) being configured such that steam flowing from the introduction part (110) and the nozzle part (220) collides with the partition wall (211), wherein the partition wall is configured to change a flow direction of the collided steam, wherein the introduction part (110) is disposed in lower side of the second body (100) and comprises an outlet (111h) configured to communicate with the second body (100), and a tapered end configured to be connected with the steam unit (40).

FIG.6



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Description

[0001] The present invention relates to a clothes treatment apparatus.

[0002] Clothes treatment apparatuses are apparatuses that treat clothes, e.g. wash and dry clothes and smooth wrinkles in clothes, at home or at laundromats.

[0003] Clothes treatment apparatuses may be classified into a washer for washing clothes, a dryer for drying clothes, a washer/dryer having both a washing function and a drying function, a refresher for refreshing clothes, and a steamer for removing unnecessary wrinkles in clothes.

[0004] The refresher is an apparatus that keep clothes comfortable and fresh. The refresher functions to dry clothes, to supply fragrance to clothes, to prevent the occurrence of static electricity in clothes, or to remove wrinkles from clothes.

[0005] The steamer is an apparatus that simply supplies steam to clothes in order to remove wrinkles from the clothes. Unlike a general iron, the steamer removes wrinkles from the clothes without directly applying heat to the clothes.

[0006] A clothes treatment apparatus having both functions of a refresher and a steamer may remove wrinkles from clothes received in the clothes treatment apparatus, and may additionally deodorize the clothes, using steam and hot air.

[0007] For a conventional clothes treatment apparatus having a nozzle for supplying steam to clothes, condensed water is generated during the flow of steam from a steam unit to the nozzle, and the condensed water is directly sprayed through the nozzle. In particular, since a flow channel, along which the steam flows, is not sufficiently heated in an initial spray stage, the condensed water is generated more easily. If the condensed water is directly sprayed to clothes through the nozzle, the clothes may be damaged, and a large amount of condensed water may be collected in a treatment chamber. Even after the completion of a drying cycle, in which hot air is supplied into the treatment chamber, the collected water may not be completely removed from the treatment chamber, which causes sanitary problems.

[0008] Therefore, the present invention has been made in view of the above problems.

[0009] It is an object of the present invention to provide a clothes treatment apparatus that is capable of preventing water from being sprayed into a treatment chamber through a nozzle.

[0010] It is another object of the present invention to provide a clothes treatment apparatus that is capable of preventing condensed water from being collected in a treatment chamber.

[0011] The objects are solved by the independent claim. The dependent claims relate to further aspects of the invention.

[0012] In accordance with an aspect of the present invention, the above and other objects can be accomplished by the provision of a clothes treatment apparatus including a cabinet having a treatment chamber for allowing clothes to be hung therein, a steam unit disposed in the cabinet for generating steam, and a steam spray device disposed in the cabinet for spraying steam into the treatment chamber, wherein the steam spray device includes a main body part having a space defined therein, an introduction part disposed in the main body part, the introduction part communicating with the space, the introduction part being configured such that the steam generated by the steam unit is introduced through the introduction part, a nozzle part disposed in the main body part, the nozzle part communicating with the space, the nozzle part being configured to discharge steam in the space into the treatment chamber, a condensed water discharge part disposed in the main body part for discharging condensed water in the space out of the main body part, and a partition wall disposed in the main body part for partitioning at least a portion of the space into a first space and a second space, the partition wall defining a gap through which steam flows from the first space to the second space, the partition wall being configured such that steam flowing from the introduction part and the nozzle part collides with the partition wall.

[0013] The introduction part may be disposed in the first space, and the nozzle part may be disposed in the second space.

[0014] The condensed water discharge part may be disposed in the second space.

[0015] The condensed water discharge part may be disposed in a portion of the space excluding the first space.

[0016] The partition wall may extend downward from the inner upper side surface of the main body part, and may define the gap together with the inner bottom surface of the main body part.

[0017] The partition wall may be located at the upper side of the introduction part.

[0018] The partition wall may be formed so as to be longer than the nozzle part.

[0019] The introduction part may be located at the lower side of the partition wall, and may be disposed over the first space and the second space.

[0020] The introduction part may have an outlet, through which steam is discharged, the outlet being formed so as to face the first space.

[0021] The introduction part may have an outlet, through which steam is discharged, the outlet being formed so as to face a side part disposed opposite to the partition wall, the side part defining the space.

[0022] The nozzle part may be disposed in the second space, and the introduction part may have an outlet, through which steam is discharged, the outlet being formed so as to be with its back to the nozzle part.

[0023] The nozzle part may be disposed in the second space, and the introduction part may have an outlet, through which steam is discharged, the outlet being formed so as to be with its back to the second space.

[0024] The introduction part may have an outlet, through which steam is discharged, the outlet being located in the first space, and the nozzle part may be located in the second space.

[0025] The outlet may be formed so as to face the first space.

[0026] The outlet may be formed so as to face the first space and to be with its back to the second space.

[0027] The outlet may be formed so as to face the first space and to be with its back to the nozzle part.

[0028] The outlet may be located in the gap.

[0029] The main body part may include an upper body, in which the nozzle part is disposed, and a lower body, in which the introduction part and the condensed water discharge part are disposed, the lower body being coupled to the upper body to define the space. The partition wall may be disposed in the upper body, and the gap may be defined between the partition wall and the lower body.

[0030] The introduction part may have an outlet, through which steam is discharged, the outlet being formed so as to face the first space, and the nozzle part may be located in the second space.

[0031] The lower body may be provided with an inclined surface for guiding condensed water to the condensed water discharge part, and the partition wall may be located at the upper side of the inclined surface.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] The embodiments will be described in detail with reference to the following drawings in which like reference numerals refer to like elements wherein:

FIG. 1 is a perspective view of a clothes treatment apparatus according to a first embodiment of the present invention;

FIG. 2 is a front perspective view of the clothes treatment apparatus according to the first embodiment of the present invention;

FIG. 3 is an exploded perspective view of a cycle assembly according to a first embodiment of the present invention;

FIG. 4 is a perspective view of the cycle assembly according to the first embodiment of the present invention;

FIG. 5 is a perspective view of a steam spray device according to a first embodiment of the present invention;

FIG. 6 is a sectional perspective view taken along line A-A' of FIG. 5;

FIG. 7 is a sectional perspective view taken in a direction perpendicular to line A-A' of FIG. 5;

FIG. 8 is a perspective view showing a lower body constituting the steam spray device of FIG. 5;

FIG. 9 is a side view of the lower body shown in FIG. 8;

FIG. 10 is a sectional view taken along line B-B' of FIG. 8;

FIG. 11 is a perspective view showing an upper body constituting the steam spray device of FIG. 5;

FIG. 12 is a plan view of the upper body shown in FIG. 11;

FIG. 13 is a bottom view of the upper body shown in FIG. 11;

FIG. 14 is a side view of the upper body shown in FIG. 11;

FIG. 15 is a sectional view of the upper body taken along line C-C' of FIG. 11; and

FIG. 16 is a block diagram of the clothes treatment apparatus according to the first embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0033] The present invention will be described in detail with reference to the accompanying drawings.

[0034] In the following description of the present invention, a detailed description of known functions or configurations incorporated herein will be omitted when it may make the subject matter of the present invention rather unclear. The same terms may be denoted by different reference numerals if the terms indicate different parts.

[0035] The terms used in the following description are terms defined taking into consideration the functions obtained in accordance with the present invention. The definitions of these terms should be determined based on the whole content of this specification because they may be changed in accordance with the intentions of users, such as experimenters and measurers, or usual practices.

[0036] In this specification, the terms "first," "second," etc. are used to describe various elements. However, the elements are not limited by the terms. The terms are used only to distinguish one element from another element. For example, a first element may be named a second element, and a second element may be named a first element, without departing from the scope of right of the present invention. It will be understood that the term "and/or" refers to one or more possible combinations of specified relevant items and includes such combinations.

[0037] The terms used in this specification are provided only to explain specific embodiments, but are not intended to restrict the present invention. A singular representation may include a plural representation unless it represents a definitely different meaning from the context.

[0038] Unless otherwise defined, all terms, including technical and scientific terms, used in this specification have the same meaning as commonly understood by a person having ordinary skill in the art to which the present invention pertains. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant

art and the present disclosure, and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0039] In addition, the terms "comprises" and "includes" described herein should be interpreted not to exclude other elements but to further include such other elements since the corresponding elements may be inherent unless mentioned otherwise.

[0040] Hereinafter, a clothes treatment apparatus 1 according to a first embodiment of the present invention will be described with reference to FIGS. 1 to 4 and 16.

[0041] The clothes treatment apparatus 1 according to this embodiment includes a cabinet 10 and a door 20 configured to open and close the front of the cabinet 10.

[0042] The interior of the cabinet 10 is partitioned into upper and lower interior parts by a partition plate 11. A treatment chamber 12, in which clothes are hung, is defined in the interior of the cabinet 10 above the partition plate 11. A cycle chamber 14, in which machinery is installed, is defined in the interior of the cabinet 10 below the partition plate 11.

[0043] Clothes are hung in the treatment chamber 12. In the treatment chamber 12, wrinkles in the clothes are smoothed, or the clothes are deodorized, by the circulation of steam or air.

[0044] A hanger support bar 13 configured to support clothes hangers, on which clothes are hung, is provided in the upper part of the treatment chamber 12. The hanger support bar 13 may be configured to be moved in the treatment chamber 12 in forward and rearward directions, in upward and downward directions, and/or in leftward and rightward directions by a driving device (not shown), such as a motor. The hanger support bar 13 may be periodically reciprocated.

[0045] An air blowing port 16 and a steam discharge port 17 are formed in the treatment chamber 12.

[0046] In this embodiment, the air blowing port 16 and the steam discharge port 17 are formed in a discharge panel 15.

[0047] Unlike this embodiment, the air blowing port 16 and the steam discharge port 17 may be formed in different panels. In this embodiment, the discharge panel 15 constitutes a portion of the cycle chamber 14. The discharge panel 15 is located at the rear side of the partition plate 11. The discharge panel 15 and the partition plate 11 form a continuous surface. The discharge panel 15 is inclined toward the partition plate 11.

[0048] Air blown by a blowing unit 30 is discharged through the air blowing port 16.

[0049] Steam generated by a steam unit 40 is discharged through the steam discharge port 17.

[0050] A blowing unit 30 for circulating air in the treatment chamber 12, a steam unit 40 for supplying steam into the treatment chamber 12, a heat pump unit 50 for conditioning air in the treatment chamber 12, and a control unit 60 for controlling the respective units 30, 40, and 50 are installed in the cycle chamber 14.

[0051] In this embodiment, an assembly of machinery, including the blowing unit 30, the steam unit 40, the heat pump unit 50, and the control unit 60, which are required to perform respective cycles of the clothes treatment apparatus, is defined as a cycle assembly.

[0052] The blowing unit 30 includes a blowing fan 32 and an inlet duct 34.

[0053] The inlet duct 34 is installed at the suction side of the blowing fan 32 to guide air in the treatment chamber 12 to the blowing fan 32.

[0054] The blowing fan 32 is rotated to blow air. The blowing fan 32 suctions air from the treatment chamber 12, and discharges the suctioned air to the heat pump unit 50.

[0055] When the steam unit 40 is powered on, heat is generated from the steam unit 40. The steam unit 40 converts water supplied from a water supply tank 80, which will be described hereinafter, into steam. The generated steam is discharged into the treatment chamber 12.

[0056] In this embodiment, a flow channel is defined such that the steam flows into the treatment chamber 12 via the heat pump unit 50.

[0057] The heat pump unit 50 constitutes a heat pump cycle including a compressor, a condenser, an evaporator, and an expansion valve. Based on the operation mode of the heat pump unit 50, cooled air or heated air may be discharged into the treatment chamber 12.

[0058] In particular, the heat pump unit 50 may heat air around the condenser through heat exchange with a refrigerant, and may supply the heated air into the treatment chamber 12 through the blowing unit 30. The high-temperature air, which is supplied into the treatment chamber 12, is used to treat clothes that are hung on the clothes hangers, which are supported by the hanger support bar 13. Of course, in a case which the heat pump unit 50 is not operated, but only the blowing unit is operated, roomtemperature air is supplied into the treatment chamber 12. In addition, air cooled by the evaporator may be supplied into the treatment chamber 12 through the blowing unit 30.

[0059] The heat pump unit 50 may dehumidify the air in the treatment chamber 12.

[0060] A tank module 70 for storing water is installed in front of the cycle chamber 14. The tank module 70 includes a water supply tank 80 for supplying water to the steam unit 40 and a drainage tank 90 for collecting and storing condensed water that is generated in the treatment chamber 12.

[0061] A water supply level sensor 81 for sensing the level of water stored in the water supply tank 80 is installed in the water supply tank 80, and a drainage level sensor 91 for sensing the level of water stored in the drainage tank 90 is installed in the drainage tank 90.

[0062] Water from the water supply tank 80 flows to the steam unit 40 via a water supply pump 45.

[0063] Water that is condensed in the treatment chamber 12 flows to the lower side of the treatment chamber 12 due to gravity, and is then pumped to the drainage

tank 90 by a drainage pump 46. Water that is condensed in the heat pump unit 50 also flows to the drainage tank 90 via the drainage pump 46.

[0064] The water supply pump 45 or the drainage pump 46 is controlled by the control unit 60.

[0065] In this embodiment, a tank module frame 71 is installed in front of the inlet duct 34.

[0066] A tank installation space 73 is defined between the tank module frame 71 and the door 20. The tank module frame 71 is coupled to the partition plate 11 to isolate the cycle chamber 14 from the outside.

[0067] A tank support bar 75, which interferes with at least one selected from between the water supply tank 80 and the drainage tank 90, is installed in front of the tank installation space 73.

[0068] The tank support bar 75 prevents the water supply tank 80 or the drainage tank 90 from being unintentionally separated from the tank installation space 73. The tank support bar 75 supports the front of the water supply tank 80 and the front of the drainage tank 90.

[0069] When the door 20 is opened and closed, therefore, the water supply tank 80 and the drainage tank 90 are prevented from being separated from the tank installation space 73.

[0070] In this embodiment, the lower end of the water supply tank 80 is placed on the upper end of the tank support bar 75, and the lower end of the drainage tank 90 is placed on the upper end of the tank support bar 75.

[0071] A tank support end 79, which interferes with the tank support bar 75, is formed on at least one selected from between the water supply tank 80 and the drainage tank 90.

[0072] The tank support end 79 is concavely recessed.

[0073] The front of the tank support bar 75 and the front of the water supply tank 80 may form a continuous surface due to the tank support end 79. In addition, the front of the tank support bar 75 and the front of the drainage tank 90 may form a continuous surface due to the tank support end 79.

[0074] The water supply tank 80 and the drainage tank 90 are disposed in the tank installation space 73 such that the water supply tank 80 and the drainage tank 90 are arranged parallel to each other in rightward and leftward directions.

[0075] When the door 20 is opened, the water supply tank 80 and the drainage tank 90 are exposed to a user.

[0076] The water supply tank 80 and the drainage tank 90 may be withdrawn by the user.

[0077] The water supply tank 80 and the drainage tank 90 may be separated from the tank module frame 71. The water supply tank 80 and the drainage tank 90 may be separably mounted in the tank installation space 73.

[0078] The water supply tank 80 is connected to the steam unit 40 to supply water to the steam unit 40. The drainage tank 90 is connected to the treatment chamber 12 to store water discharged from the treatment chamber 12 or the heat pump unit 50.

[0079] The drainage tank 90 is identical in function to the water supply tank 80. The drainage tank 90 is disposed alongside the water supply tank 80.

[0080] Hereinafter, a steam spray device 300 according to a first embodiment of the present invention will be described in detail with reference to FIGS. 5 to 15.

[0081] When steam generated by the steam unit 40 is supplied to the steam spray device 300, the steam spray device 300 sprays the received steam into the treatment chamber 12.

[0082] The steam spray device 300 includes an introduction part 110, through which steam is introduced, a nozzle part 220 for discharging the steam introduced through the introduction part 110 into the treatment chamber 12, a main body part 310 for guiding the steam supplied through the introduction part 110 to the nozzle part 220, a space S, which is defined in the main body part 310 and in which the introduction part 110 and the nozzle part 220 are connected to each other, a partition wall 211 formed in the space S such that steam flowing from the introduction part 110 and the nozzle part 220 collides with the partition wall 211, and a condensed water discharge part 130 formed in the main body part 310 for discharging condensed water from the space S.

[0083] The introduction part 110 is connected to the steam unit 40. The introduction part 110 defines a flow channel, along which steam generated by the steam unit 40 is guided to the space S.

[0084] The introduction part 110 is formed in the shape of a pipe, in which steam flows. In this embodiment, at least a portion of the introduction part 110 protrudes into the space S, which is defined in the main body part 310. Unlike this embodiment, the introduction part 110 may not protrude into the space S.

[0085] An outlet 111h, through which steam is discharged, is formed in a portion 111 of the introduction part 110 that protrudes into the space S. In addition, an inlet of the introduction part 110, through which steam is introduced, is formed outside the main body part 310. A flow channel defining member, such as a hose or a pipe, may be coupled to the inlet of the introduction part 110. The flow channel defining member may be connected to the steam unit 40.

[0086] The space S is defined in the main body part 310. The other parts of the main body part 310, excluding the introduction part 110, the nozzle part 220, and the condensed water discharge part 130, are sealed.

[0087] The main body part 310 may be formed as a single member. In this embodiment, the steam spray device 300 includes a lower body 100 and an upper body 200.

[0088] The steam spray device 300 is defined by a bottom part 121 and a side part 122 of the lower body 100 and a cover part 210 of the upper body 200. Condensed water is collected on the bottom part 121. The side part 122 extends upward from the perimeter of the bottom part 121.

[0089] The partition wall 211 partitions the space S, which is defined in the main body part 310, into at least

two parts. The partition wall 211 partitions only a portion of the space S. The remaining portions of the space S are connected to each other.

[0090] The partition wall 211 interferes with steam that flows in the main body part 310. The partition wall 211 interferes with steam that flows the shortest distance, with the result that the movement path of the steam is complicated.

[0091] The partition wall 211 is provided to prevent condensed water in the space S from directly moving to the nozzle part 220. The partition wall 211 maximally prevents condensed water from flowing to the nozzle part 220 due to pressure.

[0092] The partition wall 211 partitions the space S into a first space S1, in which the introduction part 110 is located, and a second space S2, in which the nozzle part 220 is located. Partitioning, achieved by the partition wall 211, does not completely prevent the flow of steam between the first space S1 and the second space S2, but defines a gap P, through which steam flows.

[0093] The gap P is defined between the partition wall 211 and the bottom part 121. The first space S1 and the second space S2 communicate with each other through the gap P. In this embodiment, the partition wall 211 does not extend to the bottom part 121, but the gap P is defined between the partition wall 211 and the bottom part 121. Unlike this embodiment, the partition wall 211 may protrude from the bottom part 121. In this case, the gap P may be defined between the partition wall extending from the cover part 210 and the partition wall extending from the bottom part 121.

[0094] In addition, the partition wall may be disposed such that the cover part 210 and the bottom part 121 are connected to each other via the partition wall. In this case, holes or openings may be formed through the partition wall such that steam can flow through the holes or openings.

[0095] As described above, the partition wall 211 may be configured to have various shapes.

[0096] In this embodiment, the introduction part 110 is disposed in the first space S1, and the condensed water discharge part 130 is disposed in the second space S2. The condensed water discharge part 130 may be disposed in a portion of the space S excluding the first space S1.

[0097] This is because, if the condensed water discharge part 130 is disposed in the first space S1, condensed water and steam may be discharged simultaneously.

[0098] The partition wall 211 partitions a portion of the space S into left and right parts on the basis of the main body part 310.

[0099] The partition wall 211 is formed only at a portion of the cover part 210. In this embodiment, the partition wall 211 is located at the rear of the main body part 310, where the nozzle part 220 is formed.

[0100] The partition wall 211 is formed to have a length greater than the length of the nozzle part 220 in forward and rearward directions. The partition wall 211 is formed to have a sufficient length to cover the nozzle part 220.

[0101] In front of the partition wall 211, the first space S1 and the second space S2 are connected to each other.

[0102] In this embodiment, the partition wall 211 is located higher than the outlet 111h.

[0103] Steam discharged from the introduction part 110 flows from the first space S1 to the second space S2. At this time, the steam collides with the partition wall 211. As a result, condensed water contained in the steam adheres to or collides with the surface of the partition wall 211, and falls to the lower side of the partition wall 211 due to gravity.

[0104] The condensed water, colliding with the partition wall 211, falls to the bottom of the main body part 310 (i.e. the bottom part 121 of the lower body 200). That is, the partition wall 211 resists the flow of the steam. Condensed water discharged from the introduction part 110 and condensed water generated in the space S may adhere to the surface of the partition wall 211.

[0105] The condensed water discharge part 130 discharges condensed water from the main body part 310. The condensed water discharge part 130 communicates with the space S.

[0106] The condensed water discharge part 130 is formed in the shape of a pipe that defines a flow channel in which condensed water flows. An inlet, through which condensed water is introduced, is formed in the bottom part 121 of the main body part 310, and an outlet, through which condensed water is discharged, is formed in a portion of the main body part 310 that extends outward (specifically, downward).

[0107] The introduction part 110 discharges steam into the first space S1, which is defined in the main body part 310. In this embodiment, the outlet 111h of the introduction part 110 is open toward the side part 122. The outlet 111h of the introduction part 110 may not face the nozzle part 220. The outlet 111h of the introduction part 110 may not face the second space S2. The direction of the outlet 111h is defined such that condensed water discharged from the introduction part 110 interferes with the partition wall 211, and then flows to the second space S2.

[0108] The outlet 111h is located with its back to the nozzle part 220.

[0109] The outlet 111h is located with its back to the second space S2.

[0110] The outlet 111h faces a lateral direction.

[0111] The outlet 111h is located in the first space S1. The introduction part 110 is disposed over the first space S1 and the second space S2. However, the outlet 111h is located in the first space S1 such that steam discharged from the introduction part 110 is prevented from directly moving to the second space S2.

[0112] Since steam discharged from the introduction part 110 does not directly flow to the second space S2, but interferes with flow resistance (e.g. the side part 122 or the partition wall 211) in the first space S1, condensed water may be more efficiently collected in the first space

S1.

[0113] In this embodiment, the nozzle part 220 is disposed in the second space S2. The nozzle part 220 is located at the space opposite to the first space S1 on the basis of the partition wall 211.

[0114] The bottom part 121 may include a water collection surface 121a, in which an inlet of the condensed water discharge part 130 is formed, and an inclined surface 121b, which is inclined downward toward the water collection surface 121a.

[0115] In the main body part 310, condensed water drops onto the bottom part 121, and is then introduced into the condensed water discharge part 130 through the inlet thereof. In particular, since the condensed water flows downward to the water collection surface 121a along the inclined surface 121b, the condensed water may be effectively discharged through the condensed water discharge part 130.

[0116] The inclined surface 121b may be located under the partition wall 211. At least a portion of the inclined surface 121b may be located at the lower side of the partition wall 211.

[0117] Meanwhile, the nozzle part 220 extends upward from the main body part 310. The nozzle part 220 defines a flow channel, in which steam flows. The flow channel extends from an inlet, through which steam is introduced from the main body part 310, to an outlet 221, through which the steam is sprayed into the treatment chamber 12.

[0118] The nozzle part 220 may include a plurality of outlets 221. In this case, ribs 222, which extend in a direction in which steam flows, may be formed in the flow channel. Steam may be guided to the outlets 221 along passages defined between the respective ribs 222, and may then be discharged into the treatment chamber 12 through the steam discharge port 17.

[0119] The inlet of the nozzle part 220 may be located at the upper side of the inclined surface 121b. Since high-temperature steam tends to move upward, it is advantageous for the steam to be guided while moving upward toward the nozzle part 220 along the inclined surface 121b in terms of flowability.

[0120] The steam spray device 300 may be constituted by at least two parts. In this embodiment, the steam spray device 300 includes a lower body 100, in which the introduction part 110 and the condensed water discharge part 130 are formed, and an upper body 200, which is coupled to the lower body 100 to define the space S and in which the nozzle part 220, through which steam is discharged, is formed.

[0121] In this case, the partition wall 211 may extend downward from the upper body 200 toward the lower body 100, and the lower end of the partition wall 211 may be spaced apart from the lower body 100.

[0122] The nozzle part 220 is formed so as to extend through the cover part 210.

[0123] The inlet of the nozzle part 220 is formed in the bottom surface 213 (see FIG. 13) of the cover part 210, which covers the space S of the upper body 200. The outlet 221 of the nozzle part 220 extends upward from the top surface 212 of the cover part 210.

[0124] The upper body 200 and the lower body 100 may be separably coupled to each other. To this end, a protrusion 128 may be formed at one selected from between the upper body 200 and the lower body 100, and a fastening part 218, which is constrained by the protrusion 128, may be formed at the other selected from between the upper body 200 and the lower body 100. The coupling between the protrusion 128 and the fastening part 218 is a kind of hook coupling. In a case in which the upper body 200 and the lower body 100 are formed of a resin material by injection molding, the protrusion 128 and the fastening part 218 exhibit a certain amount of elasticity. Consequently, coupling and decoupling between the protrusion 128 and the fastening part 218 may be easily achieved.

[0125] Meanwhile, referring to FIG. 7, the lower body 100 may be provided with a groove 126, which extends along the upper end of the side part 122, and the upper body 200 may be provided with a rib 216, which protrudes downward from the cover part 210 such that the rib 216 corresponds to the groove 126. In a state in which the rib 216 is located in the groove 126, the protrusion 128 and the fastening part 218 are fastened to each other, with the result that the lower body 100 and the upper body 200 are coupled to each other.

[0126] Meanwhile, unexplained reference numerals 125 and 215 indicate fastening holes, which are formed in the lower body 100 and the upper body 200, respectively, and through which fastening members, such as screws or bolts, are inserted. The fastening members may be inserted through the respective fastening holes, and may then be fastened to predetermined portions of the cabinet 10. As a result, the steam spray device 100 may be fixed to the cabinet 10.

[0127] Hereinafter, the flow of steam according to this embodiment will be described in more detail.

[0128] First, steam supplied through the introduction part 110 is discharged into the space S, which is defined in the main body part 310, through the outlet 111h. After the steam is discharged into the space S through the outlet 111h, the steam collides with the side part 122 adjacent to the first space S1, with the result that the flow direction of the steam is changed.

[0129] Since the steam supplied through the introduction part 110 flows upward, the steam discharged through the outlet 111h flows upward.

[0130] The steam, after colliding with the side part 122, flows to the bottom surface 213 of the cover part 210 along the side part 122, with the result that the steam collides with the partition wall 211. Since the partition wall 211 extends downward from the cover part 210, the flow direction of the steam is changed after it collides with the partition wall 211.

[0131] When the steam collides with the partition wall 211, condensed water contained in the steam drops

downward along the partition wall 211 adjacent to the first space S1. The condensed water drops due to gravity. In addition, the flow pressure of the steam is applied to the condensed water. That is, the condensed water formed on the partition wall 211 may rapidly drop onto the bottom part 121 due to the flow pressure of the steam.

[0132] The steam discharge through the outlet 111h may form a vortex in the first space S1. When the vortex is formed in the first space S1, the condensed water may drop more effectively.

[0133] Meanwhile, the steam in the first space S1 may flow to the second space S2 due to the pressure difference between the first space S1 and the second space S2. The steam in the first space S1 enters the second space S2 through the gap P, which is defined between the partition wall 211 and the bottom part 121.

[0134] Since condensed water is separated from the steam by the partition wall 211 when the steam flows from the first space S1 to the second space S2, the amount of condensed water that flows to the second space S2 may be minimized.

[0135] The steam, after flowing to the second space S2, is guided to the nozzle part 220 due to pressure, and is then discharged out of the main body part 210 through the nozzle part 220.

[0136] The steam discharged through the nozzle part 220 is supplied to the treatment chamber 12 through the steam discharge port 17.

[0137] The nozzle part 220 extends vertically. Even when a small amount of condensed water is stored in the second space S2, therefore, it is possible to maximally prevent the condensed water from being discharged due to gravity and surface tension with the main body part 310.

[0138] Meanwhile, the condensed water dropped from the partition wall 211 flows to the condensed water discharge part 130 along the bottom part 121. The condensed water, after flowing to the condensed water discharge part 130, is guided to the drainage tank 90 along a drainage channel (not shown).

[0139] The condensed water in the drainage channel is stored in the drainage tank 90 through the drainage pump 46.

[0140] As is apparent from the above description, the clothes treatment apparatus according to the present invention has the following effects.

[0141] First, the partition wall maximally prevents steam from being sprayed from the space, which is defined in the main body part, to the treatment chamber.

[0142] Second, the flow channel is defined such that the supplied steam collides with the partition wall. Consequently, it is possible to prevent the steam from directly flowing to the nozzle part.

[0143] Third, the introduction part, through which steam is introduced, and the nozzle part, through which the steam is discharged, are disposed in different spaces, which are partitioned by the partition wall. Consequently, it is possible to maximally prevent condensed water from flowing to the nozzle part.

[0144] Fourth, steam is discharged with its back to the nozzle part or the second space. Consequently, it is possible to prevent condensed water from directly flowing to the nozzle part or the second space.

[0145] Fifth, the partition wall is located at the upper side, and the gap, through which steam flows, is defined at the lower side of the partition wall. Consequently, condensed water formed on the partition wall easily drops downward due to gravity or pressure.

[0146] Sixth, the introduction part is located at the lower side of the partition wall, and the outlet, through which steam is discharged, is located in the first space. Consequently, it is possible to maximize the capacity of the first space.

[0147] Seventh, the partition wall is formed so as to have sufficient area to cover the nozzle part in the flow channel extending from the introduction part to the nozzle part. Consequently, it is possible to minimize the area of the partition wall.

[0148] Eighth, the outlet of the introduction part is located under the partition wall. Consequently, it is possible to spray steam toward the first space, which is formed at the upper side, whereby it is possible to form a vortex in the first space.

[0149] Ninth, condensed water is prevented from being sprayed into the treatment chamber. Consequently, it is possible to prevent clothes from being wetted by the condensed water.

[0150] Tenth, the amount of condensed water that is sprayed into the treatment chamber is minimized. Consequently, it is possible to maximally prevent the propagation of germs or the generation of bad smells caused by the condensed water remaining in the treatment chamber.

[0151] It will be apparent that, although the embodiments of the present invention have been described above with reference to the accompanying drawings, the present invention is not limited to the above-described specific embodiments, and therefore various modifications and variations can be made by those skilled in the art without departing from the gist of the appended claims. Thus, it is intended that the modifications and variations should not be understood independently of the technical prospect of the present invention. The above embodiments are therefore to be construed in all aspects as illustrative and not restrictive.

[0152] The invention further relates to the following numbered items:

1. A clothes treatment apparatus (1) comprising:

   a cabinet (10) having a treatment chamber (12) for allowing clothes to be hung therein; a steam unit (40) disposed in the cabinet (10) for generating steam; and a steam spray device (300) disposed in the cabinet (10) for spraying steam into the treatment chamber (12), wherein the

steam spray device (300) comprises:
a main body part (310) having a space (S) defined therein;
an introduction part (110) disposed in the main body part (310), the introduction part (110) communicating with the space (S), the introduction part (110) being configured such that the steam generated by the steam unit (40) is introduced through the introduction part (110);
a nozzle part (220) disposed in the main body part (310), the nozzle part (220) communicating with the space (S), the nozzle part (220) being configured to discharge steam in the space (S) into the treatment chamber (12);
a condensed water discharge part (130) disposed in the main body part (310) for discharging condensed water in the space (S) out of the main body part (310); and
a partition wall (211) disposed in the main body part (310) for partitioning at least a portion of the space (S) into a first space (S1) and a second space (S2), the partition wall (211) defining a gap (P) through which steam flows from the first space (S1) to the second space (S2), the partition wall (211) being configured such that steam flowing from the introduction part (110) and the nozzle part (220) collides with the partition wall (211).

2. The clothes treatment apparatus (1) according to item 1, wherein the introduction part (110) is disposed in the first space (S1), and the nozzle part (220) is disposed in the second space (2).

3. The clothes treatment apparatus (1) according to items 1 or 2, wherein the condensed water discharge part (130) is disposed in the second space (S2), and/or
wherein the condensed water discharge part (130) is disposed in a portion of the space (S) excluding the first space (S1).

4. The clothes treatment apparatus (1) according to any one of items 1 to 3, wherein the partition wall (211) extends downward from an inner upper side surface of the main body part (310), and defines the gap (P) together with an inner bottom surface of the main body part (310), and/or
wherein the partition wall (211) is located at an upper side of the introduction part (110).

5. The clothes treatment apparatus (1) according to any one of items 1 to 4, wherein the partition wall (211) is formed so as to be longer than the nozzle part (220).

6. The clothes treatment apparatus (1) according to any one of items 1 to 5, wherein the introduction part (110) is located at a lower side of the partition wall (211), and is disposed over the first space (S1) and the second space (S2).

7. The clothes treatment apparatus (1) according to any one of items 1 to 6, wherein the introduction part (110) has an outlet (111h), through which steam is discharged, the outlet (111h) being formed so as to face the first space (S1), or
wherein the introduction part (110) has an outlet (111h), through which steam is discharged, the outlet (111h) being formed so as to face a side part disposed opposite to the partition wall (211), the side part defining the space (S).

8. The clothes treatment apparatus (1) according to any one of items 1 to 6, wherein the nozzle part (220) is disposed in the second space (S2), and the introduction part (110) has an outlet (111h), through which steam is discharged, the outlet (111h) being formed so as to be with its back to the nozzle part (220), or
wherein the nozzle part (220) is disposed in the second space (S2), and the introduction part (110) has an outlet (111h), through which steam is discharged, the outlet (111h) being formed so as to be with its back to the second space (S2).

9. The clothes treatment apparatus (1) according to any one of items 1 to 6, wherein the introduction part (110) has an outlet (111h), through which steam is discharged, the outlet (111h) being located in the first space (S1), and the nozzle part (220) is located in the second space (S2).

10. The clothes treatment apparatus (1) according to item 9, wherein the outlet (111h) is formed so as to face the first space (S1).

11. The clothes treatment apparatus (1) according to item 9, wherein the outlet (111h) is formed so as to face the first space (S1) and to be with its back to the second space (S2), or
wherein the outlet (111h) is formed so as to face the first space (S1) and to be with its back to the nozzle part (220).

12. The clothes treatment apparatus (1) according to item 9, wherein the outlet (111h) is located in the gap (P).

13. The clothes treatment apparatus (1) according to any one of items 1 to 12, wherein the main body part (310) comprises:

an upper body (200), in which the nozzle part (220) is disposed; and
a lower body (100), in which the introduction part (110) and the condensed water discharge part (130) are disposed, the lower body (100) being coupled to the upper body (200) to define the space (S), and wherein
the partition wall (211) is disposed in the upper body (200), and the gap (P) is defined between the partition wall (211) and the lower body (100).

14. The clothes treatment apparatus (1) according to item 13, wherein the introduction part (110) has an outlet (111h), through which steam is discharged,

the outlet (111h) being formed so as to face the first space (S1), and the nozzle part (220) is located in the second space (S2).

15. The clothes treatment apparatus (S1) according to items 13 or 14, wherein the lower body (100) is provided with an inclined surface (121b) for guiding condensed water to the condensed water discharge part (130), and the partition wall (211) is located at an upper side of the inclined surface (121b).

Claims

1. A clothes treatment apparatus (1) comprising:

a cabinet (10) having a treatment chamber (12) for clothes, and
a cycle chamber (14) located below the treatment chamber(12);
a steam unit (40) disposed in the cabinet (10) for generating steam; and
a steam spray device (300) disposed in the cycle chamber (14) configured to provide steam into the treatment chamber (12), wherein the steam spray device (300) comprises:

a main body part (310) having a first body (200) and a second body (100) being coupled to the first body to define the space (S) therein,
an introduction part (110) disposed in the second body (100), the introduction part (110) communicating with the space (S), the introduction part (110) being configured such that the steam generated by the steam unit (40) is introduced through the introduction part (110);
a nozzle part (220) disposed in the second body (100), the nozzle part (220) communicating with the space (S), the nozzle part (220) being configured to discharge steam in the space (S) into the treatment chamber (12);
a condensed water discharge part (130) disposed in the main body part (310) for discharging condensed water in the space (S) out of the main body part (310); and
a partition wall (211) disposed in the main body part (310) for partitioning at least a portion of the space (S) into a first space (S1) and a second space (S2), the partition wall (211) defining a gap (P) through which steam flows from the first space (S1) to the second space (S2), the partition wall (211) being configured such that steam flowing from the introduction part (110) and the nozzle part (220) collides with the partition wall (211),
wherein the partition wall is configured to change a flow direction of the collided steam,
wherein the introduction part (110) is disposed in lower side of the second body (100) and comprises an outlet (111h) configured to communicate with the second body (100), and a tapered end configured to be connected with the steam unit (40).

2. The clothes treatment apparatus (1) according to claim 1,
wherein the partition wall (211) is located at a predetermined distance from the outlet (110h) of the introduction part (110).

3. The clothes treatment apparatus (1) according to claims 1 or 2,
wherein the condensed water discharge part (130) is disposed in the second space (S2), and/or wherein the condensed water discharge part (130) is disposed in a portion of the space (S) excluding the first space (S1).

4. The clothes treatment apparatus (1) according to any one of claims 1 to 3,
wherein steam is discharged through the outlet (111h), the outlet (111h) being formed so as to face the first space (S1), or
wherein steam is discharged through the outlet (111h), the outlet (111h) being formed so as to face a side part disposed opposite to the partition wall (211), the side part defining the space (S).

5. The clothes treatment apparatus (1) according to any one of claims 1 to 3,
wherein the nozzle part (220) is disposed in the second space (S2), and steam is discharged through the outlet (111h), the outlet (111h) being formed so as to be with its back to the nozzle part (220), or
wherein the nozzle part (220) is disposed in the second space (S2), and steam is discharged through the outlet (111h), the outlet (111h) being formed so as to be with its back to the second space (S2).

6. The clothes treatment apparatus (1) according to any one of claims 1 to 5,
wherein the second body (100) comprises a bottom part (121) and a side part (122), and the outer surface of the bottom part includes at least one supporting rib.

7. The clothes treatment apparatus (1) according to any one of claims 1 to 6,
wherein the first body (200) comprises a cover part (210) to define the space (S) with the bottom part (121) and the side part (122) when the first body (200) and the second body (100) are coupled.

8. The clothes treatment apparatus (1) according to claim 6 or 7,
wherein the second body (100) further comprises a groove (126) extending along the upper end of the side part (122),
the first body (200) further comprises a rib (216) protruding downward from the cover part (210), and
the rib (216) is located in the groove (126) when the first body (200) and the second body (100) are coupled to each other.

9. The clothes treatment apparatus (1) according to any one of claims 1 to 8,
wherein parts of the main body part (310), excluding the introduction part (110), the nozzle part (220), and the condensed water discharge part (130), are sealed.

10. The clothes treatment apparatus (S1) according to any one of claims 1 to 9,
wherein a protrusion (128) is provided at one selected from between the first body (200) and the second body (100), and a fastening part (218) is provided at the other selected from between the first body (200) and the second part (100) and the fastening part (218) restrained by the protrusion (128) .

11. The clothes treatment apparatus (1) according to claim 10,
wherein the fastening part (218) and the protrusion is coupled by a kind of hook coupling.

12. The clothes treatment apparatus (1) according to any one of claims 1 to 13,
wherein at least one fastening hole (215) is provided in the first body (200) and/or the second body (100) for fastening members to be inserted and then to be fastened to predetermined portions of the cabinet (10).

FIG.1

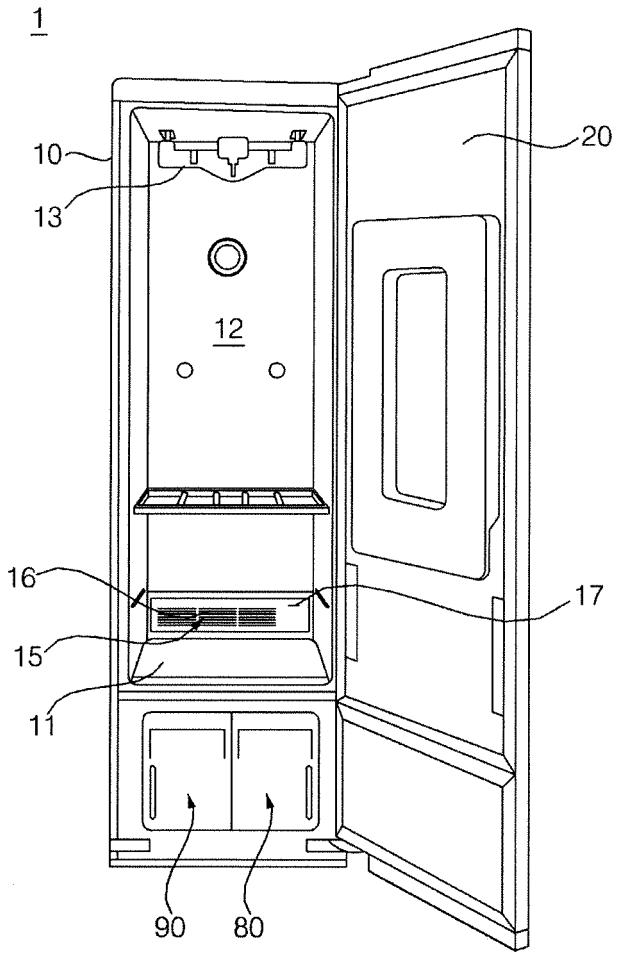


FIG.2

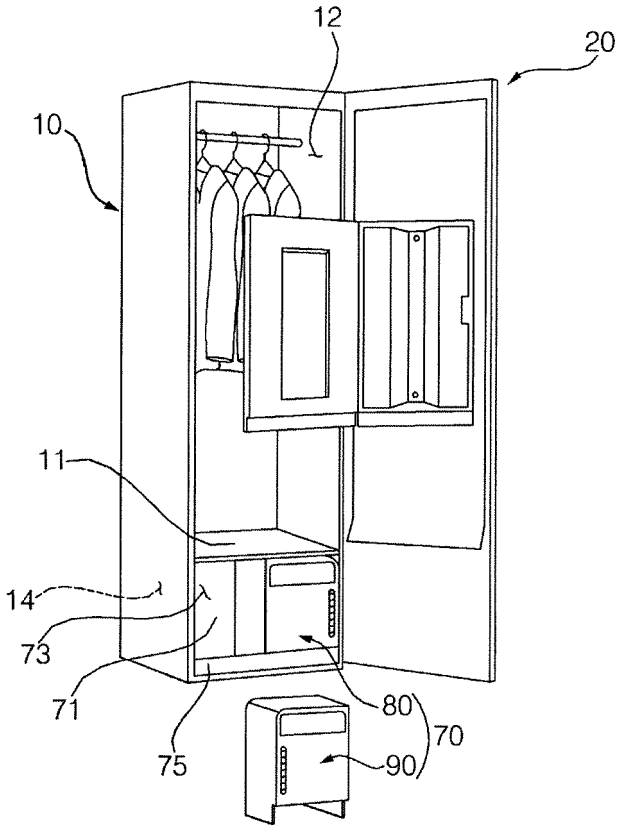


FIG.3

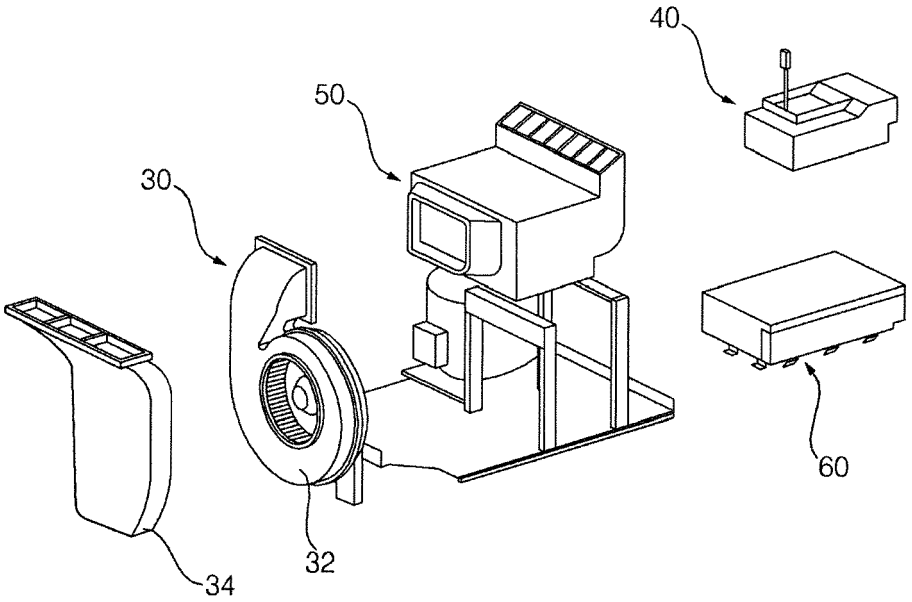


FIG.4

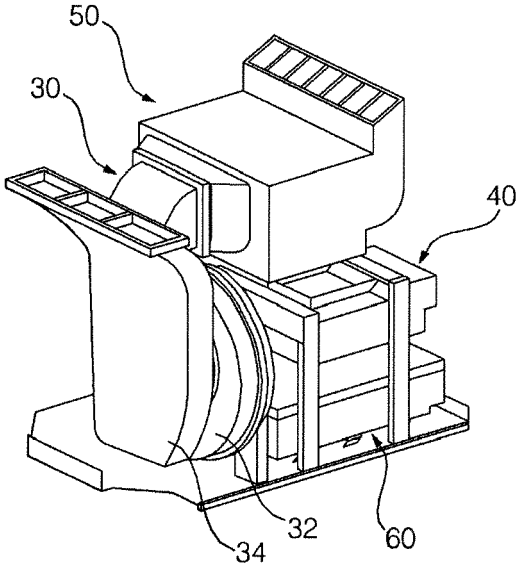


FIG.5

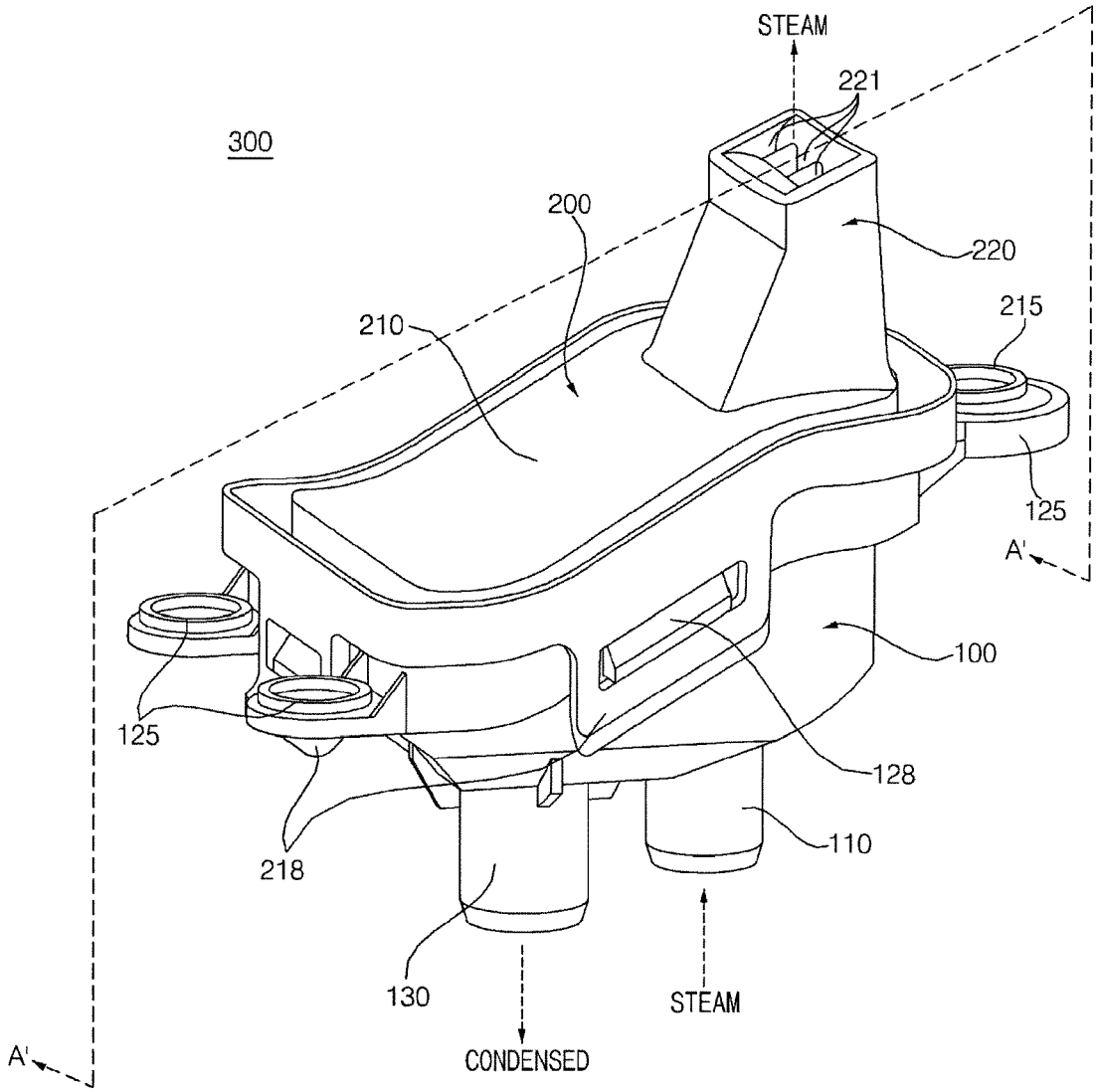

STEAM
221
300
200
220
215
210
125
A'
100
125
128
110
218
130
STEAM
A'
CONDENSED

FIG.6

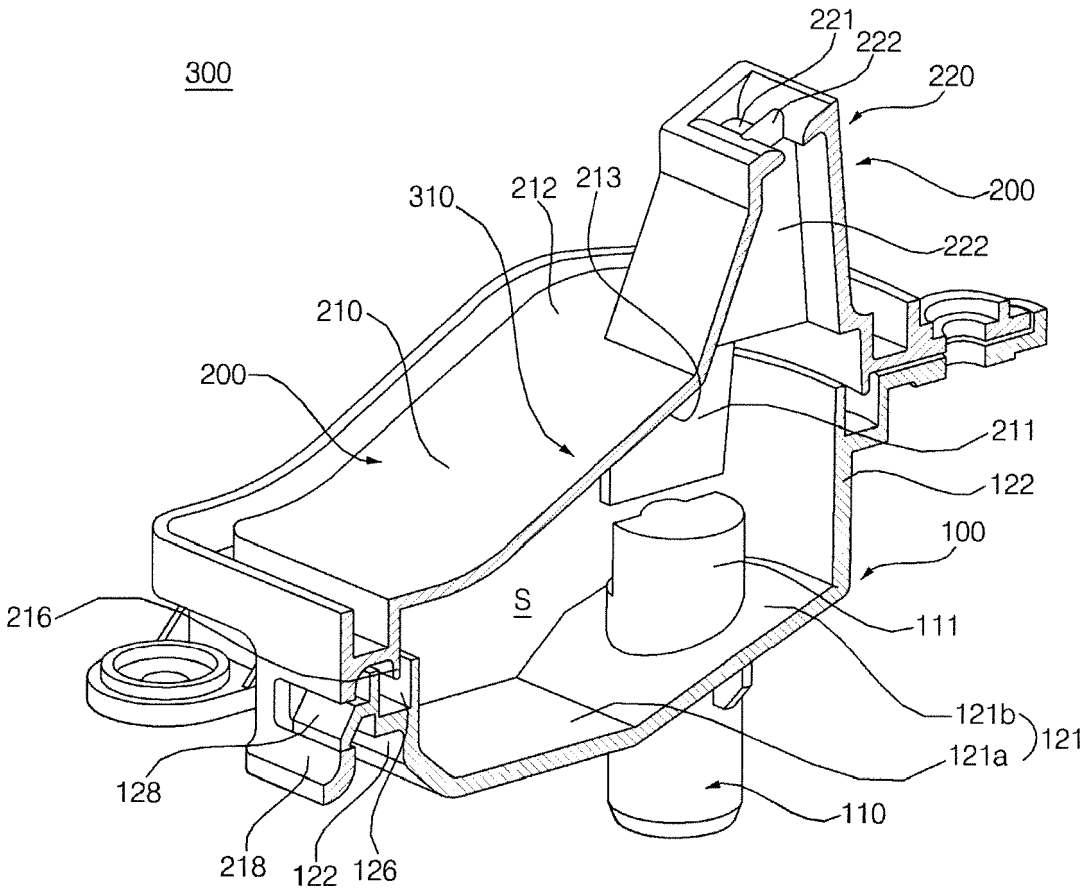

300
221
222
220
200
222
310
212
213
210
200
211
122
100
S
111
216
121b
121
121a
128
110
218
122
126

FIG.7

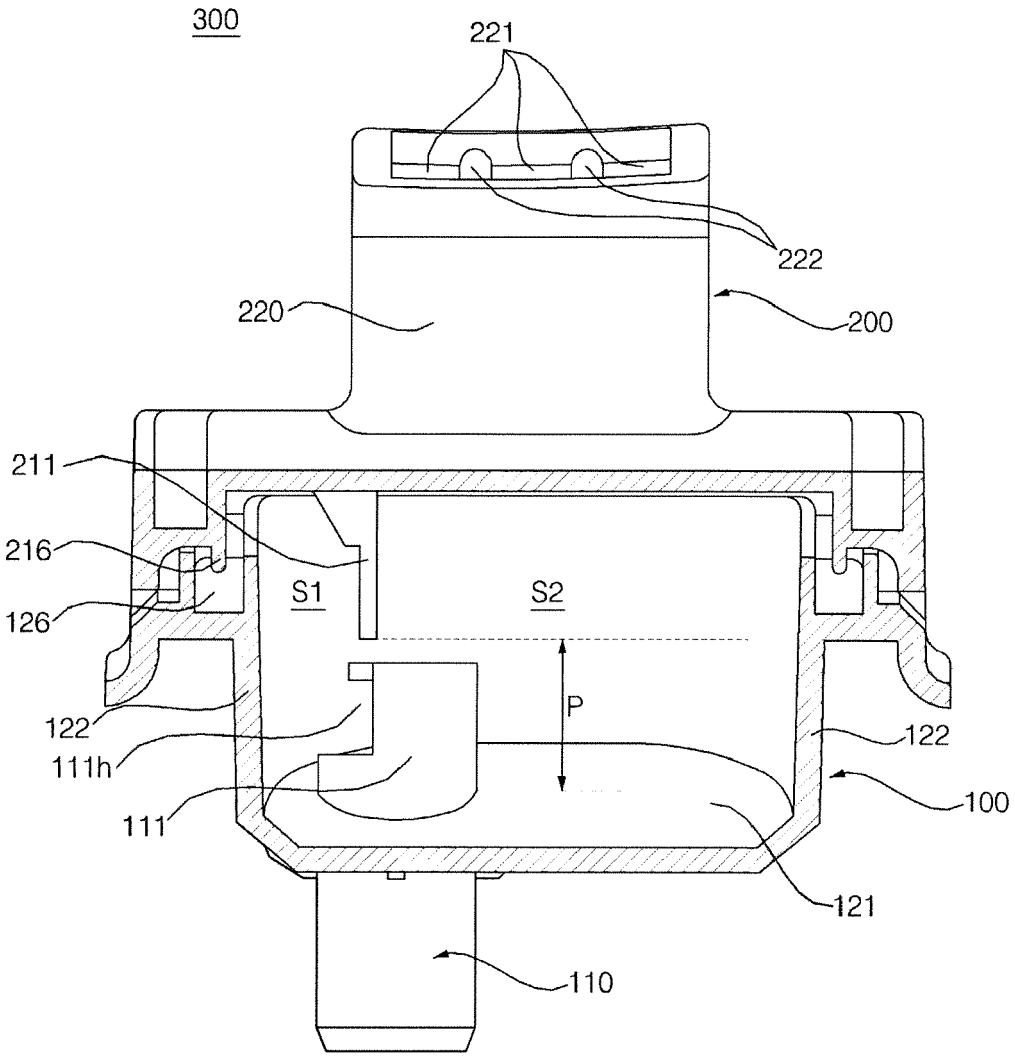

300
221
222
220
200
211
216
126
S1
S2
P
122
111h
111
122
100
121
110

FIG.8

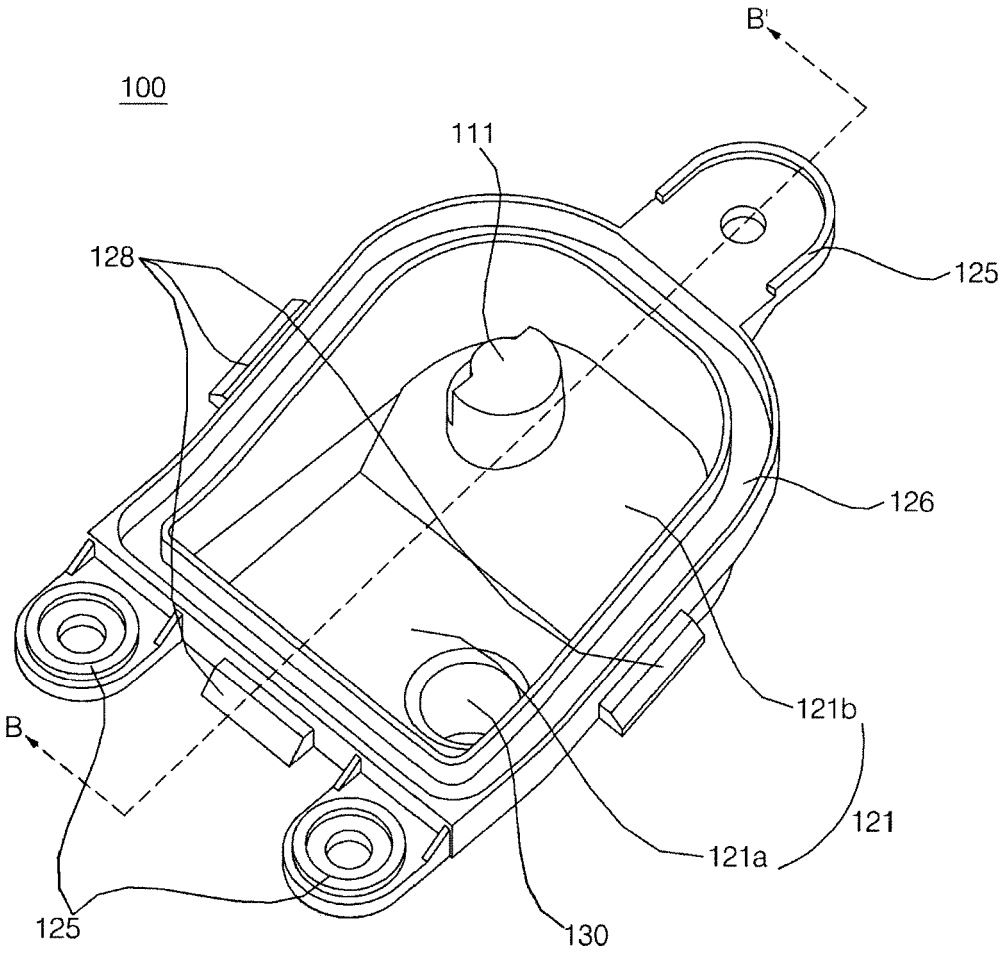


FIG.9

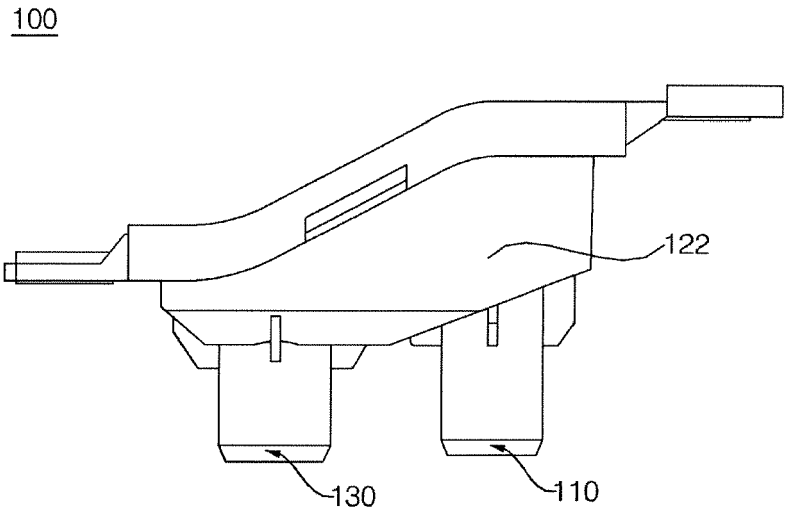


FIG.10

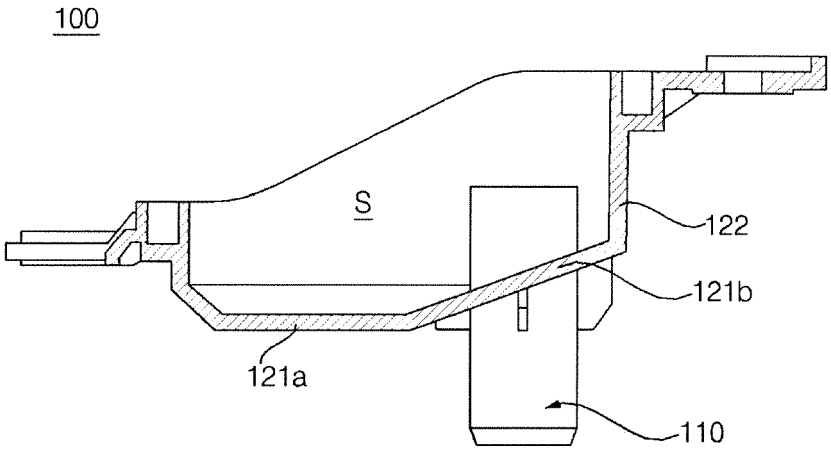


FIG.11

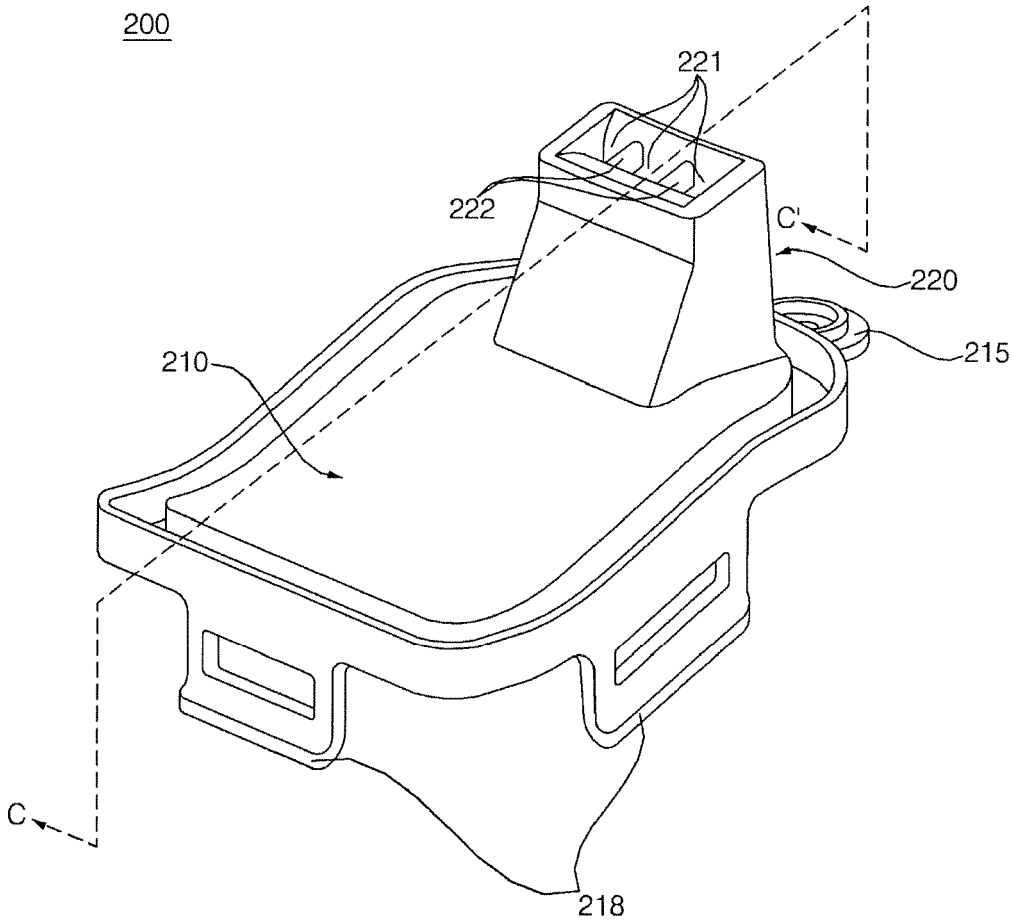


FIG.12

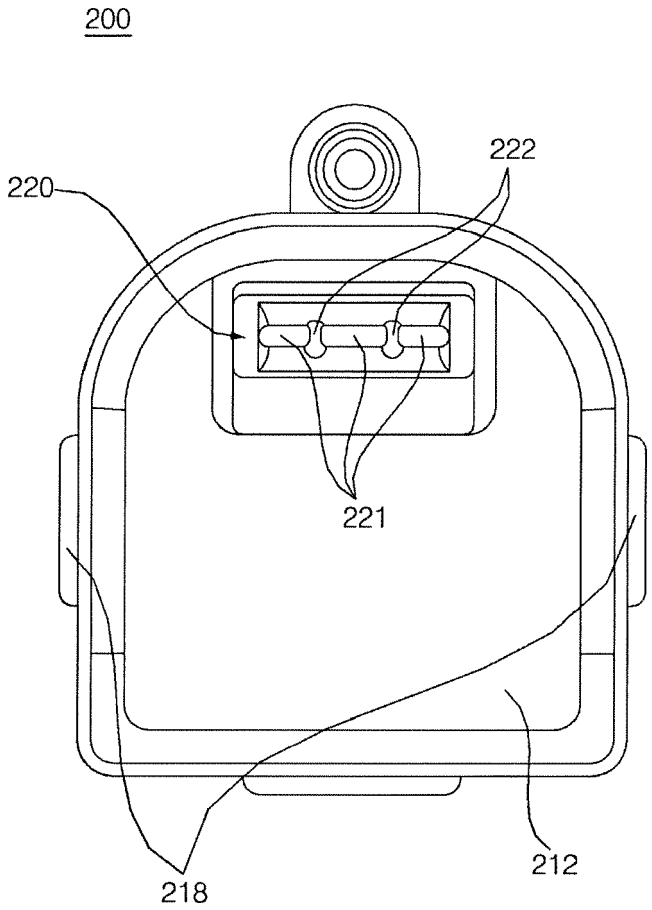


FIG.13

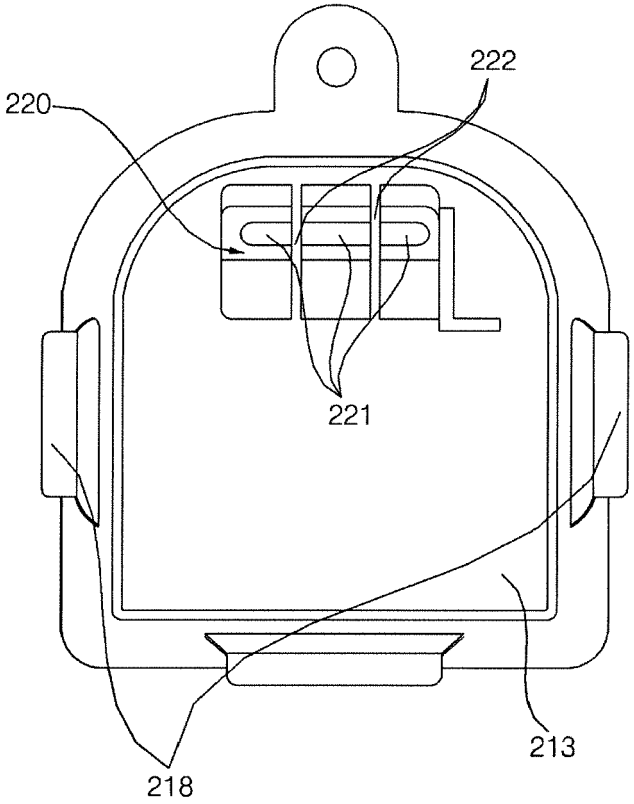


FIG.14

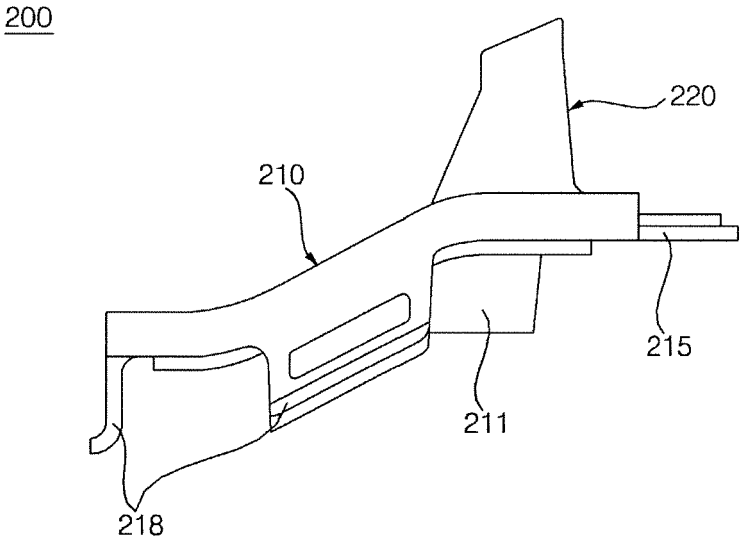


FIG.15

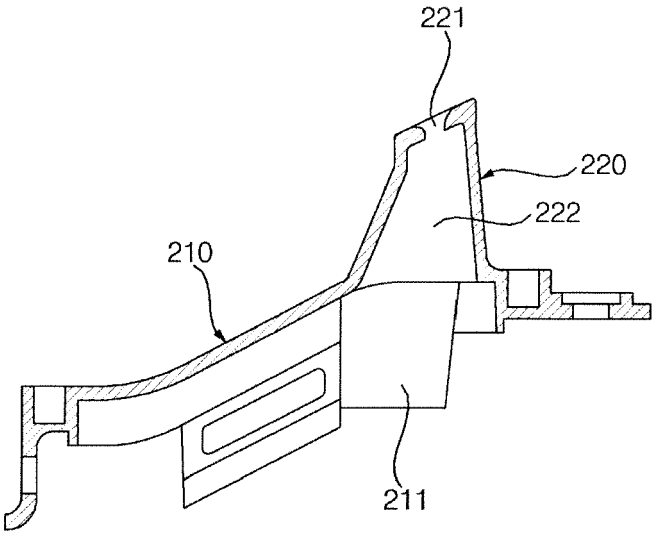
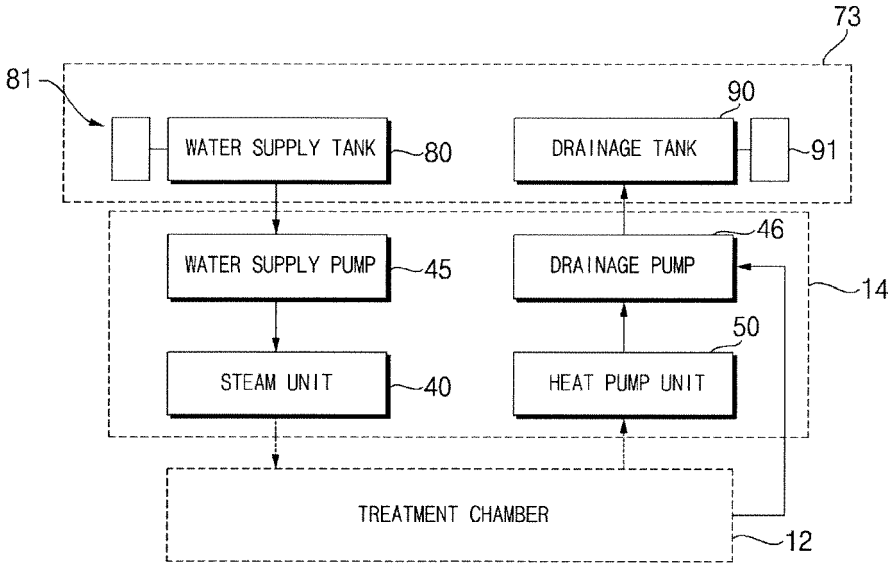

221
220
222
210
211

FIG. 16


73
81
90
WATER SUPPLY TANK
80
DRAINAGE TANK
91
46
WATER SUPPLY PUMP
45
DRAINAGE PUMP
14
50
STEAM UNIT
40
HEAT PUMP UNIT
TREATMENT CHAMBER
12

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EUROPEAN SEARCH REPORT

Application Number
EP 19 17 7899

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A	KR 2011 0067836 A (LG ELECTRONICS INC [KR]) 22 June 2011 (2011-06-22) * paragraphs [0059] - [0082] * * figures 1-7 *	1-12	ADD. D06F58/10
A	KR 2009 0050621 A (LG ELECTRONICS INC [KR]) 20 May 2009 (2009-05-20) * paragraphs [0033] - [0083] * * figures 1-4 *	1-12	
A	WO 2009/064144 A2 (LG ELECTRONICS INC [KR]; KIM JONG SEOK [KR] ET AL.) 22 May 2009 (2009-05-22) * paragraphs [0039] - [0043] * * paragraphs [0049] - [0086] * * figures 1-15 *	1-12	TECHNICAL FIELDS SEARCHED (IPC)
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A	EP 2 287 388 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 23 February 2011 (2011-02-23) * paragraphs [0028] - [0040] * * figures 2-6 *	1-12	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 September 2019	Weinberg, Ekkehard

CATEGORY OF CITED DOCUMENTS

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11-09-2019

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